

Punnett Squares – Monohybrid, Dihybrid and Sex-Linked Crosses
Integrated Science 2

Name: _____

5/07
 Period: _____

Background

Original parents in any given set of crosses are called the **parent generation or parentals**, while the two subsequent generations are denoted with the symbols **F1** and **F2** (a cross of two F1 individuals). Punnett Squares are one method for visually demonstrating the probability of offspring **genotypes** and offspring **phenotypes**.

Example 1: (Monohybrid Cross)

For humans, brown eyes are dominant (B) over blue eyes (b). A heterozygous brown-eyed man marries a heterozygous brown-eyed female. What are the possible genotypes and phenotypes of the offspring?

Parents: Male = Bb; Female = Bb

	B	b
B		
b		

The separation of the parental genotype from Bb and Bb on either side of the Punnett square represents meiosis. Each single letter represents a possible haploid condition in either an egg or a sperm, whereas the double letters represent a diploid condition.

Conventions
 1. Male alleles on top of punnett square - female alleles on the left
 2. Dominant allele (upper case) written before recessive allele (lower case)

Record the probabilities for genotypes and phenotypes of the offspring (F₂ generation) as percents and ratios. Use the following format to write genotypic ratios: homozygous dominant: heterozygous: homozygous recessive. Use the following format to write phenotypic ratios: dominant phenotype: recessive phenotype.

Genotypic Percents	Phenotypic Percent
25% BB	75% brown eyes
50% Bb	25% blue eyes
25% bb	

Monohybrid Practice Problems

1. Cystic fibrosis is a recessive genetic disorder. Ron is homozygous dominant (FF) and Nancy is a carrier (Ff) of cystic fibrosis. Use a Punnett square to predict the probability that one of their children will have cystic fibrosis? **Show all work and box your final answer.**

Genotypic Percents	Phenotypic Percents

2. Patty is homozygous dominant for freckles (SS), while Charlie is homozygous for no freckles (ss). Draw a Punnett square predicting the probability if their children will have freckles.

Genotypic Percents	Phenotypic Percents